Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-7, 9-20, 22-28 are pending in the application, with claims 1 and 17 being the independent claims. Claims 8 and 21 were previously cancelled without prejudice to or disclaimer of the subject matter therein. Claims 1 and 17 are sought to be amended without prejudice to or disclaimer of the subject matter therein. No new claims are sought to be added. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Rejections under 35 U.S.C. § 112

Claims 1-7, 9-20, and 22-28 have been rejected under 35 U.S.C. § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter. Applicant respectfully traverses and requests reconsideration.

With respect to independent claims 1 and 17, the Examiner contends that claims 1 and 17 remain unclear as to how "...other scan paths within the plurality of scan paths...considered to be good scan paths..." can contribute to "...tracing the source of errors of the bad scan path..." and further effect "...shifting the segment point of the bad scam path...", as recited in claims 1 and 17. A short exposition follows.

Masking implies an input or code necessary to drive the inputs to a buried start point, or segment point, to known values, regardless of the status of previous elements

in the segment. Masking restarts the scan test, isolating the segment of the scan path immediately following the segment point.

Claims 1 and 17, coupled with dependent claims 13 and 15, and 25 and 27, respectively, describe a methodology by which the segment point is shifted right or left depending on whether:

> "...the number of errors of an output of the bad scan path under test are greater than a bad path error threshold or the number of errors on an output of the bad scan path do not exceed the bad scan path error threshold and the number of errors on an output of any one of the good scan paths are greater than a good path error threshold...",

as recited in claims 1 and 17. That is, errors generated by the bad scan path can couple into a good scan path to cause errors in the output of the good scan path, as demonstrated in FIG. 2 of the specification.

If the bad scan error threshold is not met, but a good path error threshold is met (i.e. the number of errors determined increase the threshold), it is likely that the segment point being isolated by the masking point is not the source of errors, but rather the errors are occurring farther upstream. That is, the bad scan path is good from the segment point to the end of the path, but errors occurring nearer the beginning of the bad scan path are uncorrected by the masking code and bleeding into at least one good scan path. In this case, the segment point is then shifted to the left in an attempt to isolate the error in the bad scan path occurring farther upstream.

Alternatively, if the output of the bad scan path exceeds a bad scan path error threshold, then masking, or fixing the inputs to the current segment point, did not eliminate the error in the bad scan path. Therefore, the error source must be farther downstream in the bad scan path. In this case, the segment point is then shifted to the

right in an attempt to isolate the error in the bad scan path occurring farther downstream.

The Examiner has noted that "the 'bad path' 220 will be segmented until eliminated from examination if the 'good scan paths' are used to further the segmentation point within the 'bad path' 220. This statement is incorrect. As explained above the segmentation point in the bad scan path 220 will continue to be moved to the left, assuming that errors that bleed from the bad scan path 220 cause the good scan paths to exceed an error threshold. It does not necessarily hold that bad path 220 would be eliminated from examination. For example, if we assume the initial segmentation point is at point A on scan path 220 and we assume that flip-flop 225 is a bad flip flop. Upon doing the initial test, errors from scan path 220 would bleed into good scan path 240 through the relationship between flip flop 225 and 246. Additionally, assume that the errors that bled into good scan path 240 exceeded a good scan path error threshold. Thus, pursuant to the Shifting Element of claim 1, the segmentation point would be shifted to the left on scan path 220 to say, for example, point C. Upon running the new tests with the segmentation point at point C, no errors would be reported on either scan path 220 or scan path 240. In this way, the source of the errors would be isolated as occurring between points A and C on scan path 220. Further masking and testing could occur to further isolate the source of the errors. Nonetheless, the simply example demonstrates how error information from a good scan path can be used to locate errors on a bad scan path.

The indefinite concerns raised by the Examiner relative to independent claims 1 and 17 are understandable, and the previous paragraphs represent an earnest attempt on the part of Applicants to address the concerns of the Examiner. Withdrawal of

these 35 U.S.C. 112, second paragraph, rejections is respectfully requested. Reconsideration and allowance of independent claims 1 and 17 is respectfully requested.

Claims 2-7, 9-16, and 18-20, 22-28 are dependent on independent claims 1 and 17, respectively. For at least these reasons, dependent claims 2-7, 9-16, and 18-20, 22-28 are also patentable over the rejections of indefiniteness. Reconsideration and allowance of dependent claims 2-7, 9-16, and 18-20, 22-28 is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 1-7, 10, 20, and 22-28 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over P. Martin-de-Nicolas et al., "Method and Apparatus for Determining the Failing Operation of a Device-Under-Test", U.S. Patent Publication No. US 2003/0208710 A1, November 6, 2003 ("MdN") in view of Applicant Admitted Prior Art ("AAPA"), disclosed in the specification for the Applicant's invention. Applicants respectfully traverse and request reconsideration.

Claim 1 includes the element of shifting the segment point based on errors generated both on the bad scan path and the good scan paths ("Shifting Element"). The Examiner appears to recognize this element as being novel in the 35 U.S.C. 112 rejection, but has been confused by the Applicant. In response to the 35 U.S.C. 112 rejection, the Applicant has further clarified how good scan path results are factored into the process of shifting the segment point. With this clarification in mind, Applicant argues that neither MdN nor AAPA disclose this element.

The Examiner contends that paragraphs 0028-0029, and 0031 of MdN disclose the Shifting Element. Applicant respectfully disagrees.

> [0028] If, in step 236, a determination is made that the expected result is not substantially equivalent to the actual result, or, in step 230, a determination is made that the DUT 116 has timed out, then processing proceeds to step 232, wherein a failure is recorded. As a result of recording a failure, processing proceeds to step 238, wherein a binary-search-backward function is performed.
>
> [0029] Generally, if the DUT 116 fails a test, then the error occurred prior to the completion of the test segment. Therefore, it is desirable to reduce the number of instructions that are to be executed in the test segment in an attempt to identify the failing instruction. In the preferred embodiment, a binary search algorithm is utilized to quickly identify the failing instruction by increasing and/or decreasing the number of instructions to be executed in the test segment until the failing instruction may be identified.
>
> ...
>
> [0031] Furthermore, in step 240, if a determination is made in step 236 that the expected result is equivalent to the actual result, a binary-search-forward function is performed. Preferably, the cycle counter is modified to be substantially equivalent to the value midway between the current cycle counter and the cycle counter value for the previously failed test, or midway between the current cycle counter and the end of the test.

The cited paragraphs do not mention the use of good scan paths to assist in the determination of how to move a segment point. In fact they specifically describe only considering the results of a single device under test, presumably not distinguishing among good and bad scan paths within the device. Thus, the process used in MdN fails to use additional information that can be gleaned from errors on good scan paths to improve the efficiency of testing, thereby defeating a fundamental purpose of the present claim 1.

Furthermore, with respect to the Examiner's arguments rejecting claim 9, the Examiner states that MdN does not teach a determination of the number of errors generated by the bad scan path following the segment point and each of the good scan paths. Office Action at 14. Given that the Examiner acknowledges that MdN does

not teach a determination of the number of errors generated by the good scan paths, it follows that MdN can not shift a segment point based on errors on the good scan paths.

Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over MdN, in view of AAPA as applied to claim 1, and further in view of M. Akita, "Error Correction Method and Error Correction Circuit", U.S. Patent No. 5,541,940, July 30, 1996 ("Akita") and H. Sugimoto et al., "Drive, Method for Reading Data, Information Recording Medium Reproduction Apparatus, and Method for Reproducing Data Having Reading Errors", U.S. Patent No. 6,999,386, B2, February 14, 2006 ("Sugimoto"). Neither Akita or Sugimoto disclose the shifting element, and therefore do not cure the shortcomings of MdN and AAPA in teaching, suggesting or disclosing the shifting element. Neither Akita nor Sugimoto have anything to do with scan testing. In fact, neither Akita nor Sugimoto even mention scan paths, therefore they can not possibly disclose the Shifting Element. Furthermore, the Examiner has not provided any no motivation, suggestion or teaching to combine either Akita or Sugimoto with MdN. Thus, the use of their combination to allegedly render claim 9 obvious is inappropriate.

For at least these reasons, independent claim 1 is patentable over the cited references. Independent claim 17 includes this same element. Thus, independent claim 17 is also patentable over the cited references. Reconsideration and allowance of independent claims 1 and 17 is respectfully requested.

Claims 2-7 and 9-16 are dependent on independent claim 1, while claims 18-20 and 22-28 depend on claim 17. Arguments supporting the patentability of claims 1 and 17 have been made in the preceding paragraphs. For at least these reasons,

dependent claims 2-7, 9-16, 18-20, and 22-28 are also patentable over the cited references. Reconsideration and allowance of dependent claims 2-7, 9-16, 18-20, and 22-28 is respectfully requested.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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